Remarks

The Office Action mailed January 17, 2003 has been received and reviewed. Claim 21 has been amended as suggested by the Examiner to correct for an incorrect dependency and overcomes the Examiner's objection to claim 21. No other claims have been amended or cancelled. Therefore, the pending claims are claims 1-31. Reconsideration and withdrawal of the rejections are respectfully requested in view of the above amendments and the following remarks.

The 35 U.S.C. '102 Rejection

The Examiner rejected claims 1-31 under 35 U.S.C. '102(b) as being anticipated by Anbar (U.S. Patent No. 5771261) and the article MEASURING INTELLIGENCE about Stanford-Binet Intelligence Quotient Test (hereinafter, "IQ Test"). Applicants respectfully traverse this rejection.

For a claim to be anticipated under 35 U.S.C. ' 102(b), each and every element of the claim must be found in a single prior art reference. *See* M.P.E.P. ' 2131.

The Examiner has stated in the Office Action that "Anbar does not explicitly disclose providing a slope representative of demarcation between change of blood flow over time for a deceptive person and for a non-deceptive person, and comparing the slope obtained as the result of testing to either one to determine if the person under test is deceptive or non-deceptive." Because the elements of the pending claims are not described in the single reference "Anbar," nor in the single reference "IQ Test," as clearly recognized by the Examiner, the claims of the present invention are not anticipated by either of the references. Therefore, the Examiner's rejection under 35 U.S.C. ' 102(b) is overcome.

The 35 U.S.C. '103 Rejection

It would appear from the "obviousness-type" language of page 4 of the Office Action,

that the Examiner is further rejecting the claims 1-31 as being obvious over Anbar in view of the IQ Test. Applicants respectfully traverse this rejection.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally the prior art references must teach or suggest all the claim limitations. *See* M.P.E.P. '2143.

Independent claim 1 describes a method for use in detecting deception of a person that includes providing thermal image data of at least a region of a face of a person and transforming the thermal image data to blood flow rate data. The blood flow rate data includes a slope representative of change of blood flow rate over time. Further, a slope threshold representative of a demarcation between change of blood flow rate over time for a deceptive person and change of blood flow rate over time for a non-deceptive person. The slope representative of change of blood flow rate over time is compared to the slope threshold to determine whether the person is deceptive or non-deceptive. Likewise, independent claim 9 describes a system for use in detecting deception of a person that includes a computing apparatus operable to perform substantially similar functions as set forth in claim 1.

Independent claim 18 describes a polygraph method for use in determining whether a person is being deceptive or non-deceptive with respect to a response elicited from the person. The method includes capturing thermal image data from at least one region of the face of the person during at least the elicited response and transforming the thermal image data to blood flow rate data, wherein the blood flow rate data includes a slope representative of change of blood flow rate over time in the at least one region of the face. A slope threshold representative of a demarcation between change of blood flow rate over time for a deceptive person and change of blood flow rate over time for a non-deceptive person is provided and the slope representative of change of blood flow rate over time for the person is compared to the slope threshold to

classify the person's elicited response as deceptive or non-deceptive.

Yet further, independent claim 24 describes a method for use in determining a physiological state of a person. The method includes providing thermal image data of at least a region of a face of a person and transforming the thermal image data to blood flow rate data, wherein the blood flow rate data includes a slope representative of change of blood flow rate over time. A slope threshold is provided that is representative of a demarcation between change of blood flow rate over time for a first physiological state of a person and change of blood flow rate over time for a second physiological state of a person. The slope representative of change of blood flow rate over time is compared to the slope threshold to determine whether the person is in the first or second physiological state. Likewise, independent claim 28 describes a system for use in determining a physiological state of a person that includes a computing apparatus operable to perform substantially similar functions as set forth in claim 24.

As is apparent from the above descriptions of the independent claims, each of the independent claims includes substantially the following general limitations: transformation of thermal image data to blood flow rate data, wherein the blood flow rate data includes a slope representative of change of blood flow rate over time; a slope threshold that is representative of a demarcation between change of blood flow rate over time for a first physiological state of a person (e.g., deceptive) and change of blood flow rate over time for a second physiological state of a person (e.g., non-deceptive); and a comparison between the slope representative of change of blood flow rate over time to the slope threshold.

The cited references do not describe, teach or suggest the common claim limitations set forth above. Anbar does not describe transformation of thermal image data to blood flow rate data as indicated in the original independent claims, wherein the blood flow rate data includes a slope representative of change of blood flow rate over time. Further, a slope threshold is not provided and there is no comparison of the slope transformed from the thermal image data and the slope threshold.

Anbar uses a thermal imaging system. However, Anbar does not transform thermal image data to blood flow rate data that includes a slope representative of change of blood flow rate over time. Anbar simply determines a thermal quantity referred to as "HST." HST is defined as the average temperature divided by the standard deviation of the average temperature; a dimensionless parameter. In Anbar, it is indicated that "to a much lesser extent" HST is "affected "by the blood flow in subcutaneous vessels." In other words, Anbar assumes that the quantity HST is correlated indirectly with blood perfusion. However, there is no transformation of thermal image data to blood flow rate data that includes a slope representative of change of blood flow rate over time as described in the pending claims (e.g., a heat transfer equation that allows one to compute blood flow rate values out of thermal values and determine a slope based thereon). Anbar does not compute blood flow rate values that provides the basis for slope determination, but rather Anbar uses derivative thermal values (i.e., HST) that are assumed to be, at least in part, the result of quantitatively unspecified blood flow changes.

For at least the above reasons, Anbar does not transform thermal image data to blood flow rate data that includes a slope representative of change of blood flow rate over time. The IQ Test does nothing to correct this deficiency of Anbar. For this reason alone, the independent claims are not obvious over the cited references. Further, as such a slope is not determined for use in the later functions to be performed, the other limitations of the independent claims (e.g., a slope threshold and comparison of the slope transformed from the thermal image data and the slope threshold) are not provided.

Further, there is no motivation or suggestion in the references to combine the IQ Test process with Anbar, even if for some reason, it continues to be alleged that the references show the elements of the claims. The Examiner indicates that the combination would be made so as to compare data obtained from one subject to the data obtained from a plurality of subjects. The IQ Test shows nothing more than a bell shape curve and this can hardly be compared to the slope thresholds representative of specific blood flow rate data as described in the claims. As such,

there is no suggestion of providing such slope thresholds and further there is no suggestion to use slope thresholds of any physiological parameter of the body in a comparison as described in the claims. It would appear that the Examiner is merely attempting to apply a graphical distribution to Anbar for the purpose of attaining the present invention. Such a combination does not provide all the elements of the claims, and further, there is no motivation to even make such a combination.

For the above reasons, the independent claims 1, 9, 18, 24 and 28 are not obvious in view of the cited references.

Further, the each of the other rejected claims (claims 2-8, 10-17, 19-23, 25-27, and 29-31) respectively depend on one of the independent claims, either directly or indirectly. Therefore, they include the limitations of the respective independent claim upon which they depend. As such, for the same reasons provided above with respect to the independent claims, such claims are not obvious in view of the cited references. In addition, such claims are patentable distinct over the cited references by way of their own limitations.

For example, with respect to claim 4, 12, and 21, the cited references do not show a product slope threshold. Yet further, for example, a portion of the manner of developing the product slope threshold as described in claim 3, 11, and 20 is not shown in the cited references.

For the above reasons, the rejected claims 1-31 are not obvious in view of the cited references.

Summary

It is respectfully submitted that the pending claims are in condition for allowance and notification to that effect is respectfully requested. The Examiner is invited to contact Applicants' Representatives, at the below-listed telephone number, if it is believed that prosecution of this application may be assisted thereby.

Respectfully submitted for

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CERTIFICATE UNDER 37 CFR §1.8:
The undersigned hereby certifies that this paper is being transmitted by facsimile in accordance with 37 CFR §1.6(d) to the Patent and Trademark Office, addressed to Assistant Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this
19 day of MAY, 2003, at 1:00 pm (Central Time).

By: Sandy Truehart
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APPENDIX A - CLAIM AMENDMENTS
INCLUDING NOTATIONS TO INDICATE CHANGES MADE
Serial No.:10/008,786
Docket No.: H0002443-02 (M&R 115.00250101)

Amendments to the following are indicated by underlining what has been added and bracketing what has been deleted.

In the Claims

For convenience, all pending claims are shown below.

1. A method for use in detecting deception of a person, the method comprising:

providing thermal image data of at least a region of a face of a person;

transforming the thermal image data to blood flow rate data, wherein the blood flow rate data comprises a slope representative of change of blood flow rate over time;

providing a slope threshold representative of a demarcation between change of blood flow rate over time for a deceptive person and change of blood flow rate over time for a non-deceptive person; and

comparing the slope representative of change of blood flow rate over time to the slope threshold to determine whether the person is deceptive or non-deceptive.

2. The method of claim 1, wherein providing a slope threshold comprises generating a slope threshold based on at least answer slopes representative of the change of blood flow rate over time for a plurality of subjects during at least a portion of an answer period of time in which the plurality of subjects answer questions posed thereto.

3. The method of claim 1, wherein providing a slope threshold comprises generating a slope threshold based on answer slopes representative of the change of blood flow rate over time for a plurality of subjects during at least a portion of an answer period of time in which the plurality of subjects answer questions posed thereto during a question period of time and also based on question slopes representative of the change of blood flow rate over time for a plurality of subjects during at least a portion of the question period of time.

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4. The method of claim 3, wherein providing a slope threshold comprises generating a slope threshold based on a product of corresponding question and answer slopes.

5. The method of claim 1, wherein providing the thermal image data comprises providing thermal image data of at least a region proximate an eye of the person.

6. The method of claim 1, wherein providing thermal image data comprises:

asking the person a question to elicit a response therefrom;

focusing a thermal infrared image device operable to provide thermal image data on at least the region of the face of the person; and

capturing thermal image data during at least a period of time during the response from the person.

7. The method of claim 6, wherein determining whether the person is deceptive or non-deceptive comprises determining whether the person is being deceptive or non-deceptive with respect to the response to the question.

8. The method of claim 1, wherein providing thermal image data comprises:

focusing a thermal infrared image device operable to provide thermal image data on at least the region of the face of the person;

capturing frames of thermal image data during at least a period of time; and

tracking movement of at least the region of the face of the person.

9. A system for use in detecting deception of a person, the system comprising:

a thermal infrared image device operable to provide thermal image data of at least a region of a face of a person; and

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a computing apparatus operable to:

transform the thermal image data to blood flow rate data, wherein the blood flow rate data comprises a slope representative of change of blood flow rate over time;

provide a slope threshold representative of a demarcation between change of blood flow rate over time for a deceptive person and change of blood flow rate over time for a non-deceptive person; and

compare the slope representative of change of blood flow rate over time for a person to the slope threshold to determine the person as deceptive or non-deceptive.

10. The system of claim 9, wherein the slope threshold is provided based on at least answer slopes representative of the change of blood flow rate over time for a plurality of subjects during at least a portion of an answer period of time in which the plurality of subjects answer questions posed thereto.

11. The system of claim 9, wherein the slope threshold is provided based on answer slopes representative of the change of blood flow rate over time for a plurality of subjects during at least a portion of an answer period of time in which the plurality of subjects answer questions posed thereto during a question period of time and also on question slopes representative of the change of blood flow rate over time for a plurality of subjects during at least a portion of the question period of time.

12. The system of claim 11, wherein the slope threshold is based on a product of corresponding question and answer slopes.

13. The system of claim 9, wherein the thermal infrared image device is operable to provide thermal image data of at least a region proximate an eye of the person.

14. The system of claim 9, wherein the thermal infrared image device is operable to capture thermal image data during at least a period of time during at least an elicited response from the person.

15. The system of claim 14, wherein the computing apparatus is operable to determine whether the person is deceptive or non-deceptive based on the blood flow rate data corresponding to the thermal image data captured during at least the elicited response.

16. The system of claim 9, wherein the thermal infrared image device is operable to capture frames of thermal image data during at least a period of time, and further wherein the computing apparatus is further operable to track movement of at least the region of the face of the person during the period of time.

17. The system of claim 9, wherein the system further comprises means for providing measurement of one or more physiological parameters different than blood flow rate data obtained using thermal image data, and further wherein the computing apparatus is operable to determine whether the person is deceptive or non-deceptive based on the blood flow rate data obtained using thermal image data and the one or more physiological parameters.

18. A polygraph method for use in determining whether a person is being deceptive or non-deceptive with respect to a response elicited from the person, the method comprising:

capturing thermal image data from at least one region of the face of the person during at least the elicited response;

transforming the thermal image data to blood flow rate data, wherein the blood flow rate data comprises a slope representative of change of blood flow rate over time in the at least one

region of the face;

providing a slope threshold representative of a demarcation between change of blood flow rate over time for a deceptive person and change of blood flow rate over time for a non-deceptive person; and

comparing the slope representative of change of blood flow rate over time for the person to the slope threshold to classify the person's elicited response as deceptive or non-deceptive.

19. The method of claim 18, wherein providing a slope threshold comprises generating a slope threshold based on at least answer slopes representative of the change of blood flow rate over time for a plurality of subjects during at least a portion of an answer period of time in which the plurality of subjects answer questions posed thereto.

20. The method of claim 18, wherein providing a slope threshold comprises generating a slope threshold based on answer slopes representative of the change of blood flow rate over time for a plurality of subjects during at least a portion of an answer period of time in which the plurality of subjects answer questions posed thereto during a question period of time and also based on question slopes representative of the change of blood flow rate over time for a plurality of subjects during at least a portion of the question period of time.

21. (Once Amended) The method of claim [22] 20, wherein providing a slope threshold comprises generating a slope threshold based on a product of corresponding question and answer slopes.

22. The method of claim 18, wherein capturing the thermal image data comprises capturing thermal image data of at least a region proximate an eye of the person.

23. The method of claim 18, wherein the method further comprises providing measurement

of one or more physiological parameters different than blood flow rate data obtained using thermal image data, and further wherein classifying the person elicited response as deceptive or non-deceptive comprises determining whether the person is deceptive or non-deceptive based on the blood flow rate data obtained using thermal image data and the one or more physiological parameters.

24. A method for use in determining a physiological state of a person, the method comprising:

providing thermal image data of at least a region of a face of a person;

transforming the thermal image data to blood flow rate data, wherein the blood flow rate data comprises a slope representative of change of blood flow rate over time;

providing a slope threshold representative of a demarcation between change of blood flow rate over time for a first physiological state of a person and change of blood flow rate over time for a second physiological state of a person; and

comparing the slope representative of change of blood flow rate over time to the slope threshold to determine whether the person is in the first or second physiological state.

25. The method of claim 24, wherein the first physiological state of a person and the second physiological state of a person comprise a deceptive state and a non-deceptive state, respectively.

26. The method of claim 24, wherein providing the thermal image data comprises providing thermal image data of at least a region proximate an eye of the person.

27. The method of claim 24, wherein providing thermal image data comprises:

focusing a thermal infrared image device operable to provide thermal image data on at least the region of the face of the person;

capturing frames of thermal image data during at least a period of time; and

tracking movement of at least the region of the face of the person.

28. A system for use in determining a physiological state of a person, the system comprising:

a thermal infrared image device operable to provide thermal image data of at least a region of a face of a person; and

a computing apparatus operable to:

transform the thermal image data to blood flow rate data, wherein the blood flow rate data comprises a slope representative of change of blood flow rate over time;

provide a slope threshold representative of a demarcation between change of blood flow rate over time for a first physiological state of a person and change of blood flow rate over time for a second physiological state of a person; and

compare the slope representative of change of blood flow rate over time to the slope threshold to determine whether the person is in the first or second physiological state.

29. The system of claim 28, wherein the first physiological state of a person and the second physiological state of a person comprise a deceptive state and a non-deceptive state, respectively.

30. The system of claim 28, wherein the thermal infrared image device is operable to provide thermal image data of at least a region proximate an eye of the person.

31. The system of claim 28, wherein the thermal infrared image device is operable to capture frames of thermal image data during at least a period of time, and further wherein the computing apparatus is further operable to track movement of at least the region of the face of the person during the period of time.